

# Review questions

1. Of the following transitions in the Bohr hydrogen atom, the \_\_\_\_\_ transition results in the emission of the lowest-energy photon.

- A.  $n = 1 \rightarrow n = 6$
- B.  $n = 6 \rightarrow n = 1$
- C.  $n = 6 \rightarrow n = 3$
- D.  $n = 3 \rightarrow n = 6$
- E.  $n = 1 \rightarrow n = 4$

2. Which of the following is a valid set of four quantum numbers? ( $n, l, m_l, m_s$ )

- A. 2, 1, 0, +1/2
- B. 2, 2, 1, -1/2
- C. 1, 0, 1, +1/2
- D. 2, 1, +2, +1/2
- E. 1, 1, 0, -1/2

3. The charge on an electron was determined in the \_\_\_\_\_.

- A. cathode ray tube, by J. J. Thompson
- B. Rutherford gold foil experiment
- C. Millikan oil drop experiment
- D. Dalton atomic theory
- E. atomic theory of matter

4. Consider the following selected postulates of Dalton's atomic theory:
- (i) Each element is composed of extremely small particles called atoms.
  - (ii) Atoms are indivisible.
  - (iii) Atoms of a given element are identical.
  - (iv) Atoms of different elements are different and have different properties.

Which of the postulates is(are) no longer considered valid?

- A. (i) and (ii)
- B. (ii) only
- C. (ii) and (iii)
- D. (iii) only
- E. (iii) and (iv)

5. Which one of the following configurations depicts an excited oxygen atom?

- A.  $1s^2 2s^2 2p^2$
- B.  $1s^2 2s^2 2p^2 3s^2$
- C.  $1s^2 2s^2 2p^1$
- D.  $1s^2 2s^2 2p^4$
- E.  $[\text{He}] 2s^2 2p^4$

6. Which of the following correctly represents the second ionization of aluminum?

- A.  $\text{Al}^+ (\text{g}) + \text{e}^- \rightarrow \text{Al} (\text{g})$
- B.  $\text{Al} (\text{g}) \rightarrow \text{Al}^+ (\text{g}) + \text{e}^-$
- C.  $\text{Al}^- (\text{g}) + \text{e}^- \rightarrow \text{Al}^{2-} (\text{g})$
- D.  $\text{Al}^+ (\text{g}) + \text{e}^- \rightarrow \text{Al}^{2+} (\text{g})$
- E.  $\text{Al}^+ (\text{g}) \rightarrow \text{Al}^{2+} (\text{g}) + \text{e}^-$

7. In the generation of most anions, the energy change (kJ/mol) that \_\_\_\_\_ an electron is \_\_\_\_\_.

- A. removes, positive
- B. adds, positive
- C. removes, negative
- D. adds, negative
- E. None of the above is correct.